

ServSwitch™ CWDM Mux

Send up to four bidirectional data streams simultaneously over a single pair of fiber.

Works with matching CWDM transceiver modules with wavelengths of 1530, 1550, 1570, or 1590 nm.



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Federal Communications Commission and Industry Canada Radio Frequency Interference Statements

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Instrucciones de Seguridad (Normas Oficiales Mexicanas Electrical Safety Statement)

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico debe ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

Safety Precautions and Installation Guidelines

For reliable and safe long-term operation, follow these installation guidelines:

- Only use in dry, indoor environments.
- The remote unit, local unit, and any power supplies can get warm. Do not locate them in an enclosed space without any airflow.
- Do not place a power supply directly on top of a unit.
- Do not obstruct a unit's existing ventilation holes.

To safeguard against personal injury and avoid possible damage to equipment or property:

- Only use power supplies originally supplied with the product or manufacturer-approved replacements. Do not attempt to dismantle or repair any power supply. Do not use a power supply if it appears to be defective or has a damaged case.
- Connect all power supplies to grounded outlets. In each case, make sure that the ground connection is maintained from the outlet socket through to the power supply's AC power input.
- Do not attempt to modify or repair this product, or make a connection from the interconnection link interface to any other products, especially telecommunications or network equipment.

Table of Contents

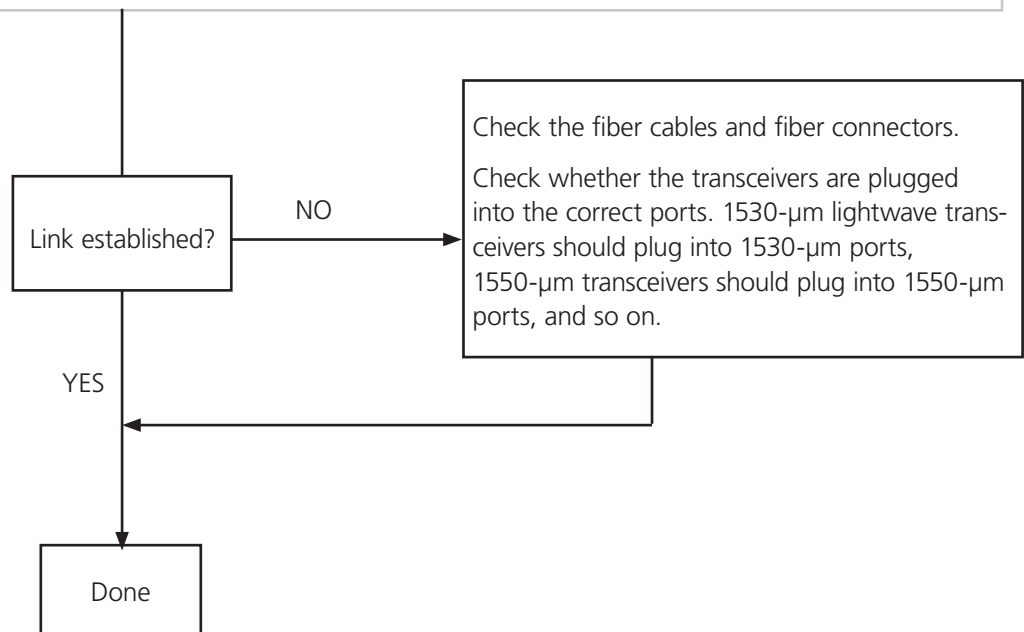
Quick Setup Guide.....	7
1. Specifications	8
2. Overview.....	9
2.1 Introduction	9
2.2 Features	9
2.3 What's Included	9
2.4 You Will Also Need.....	9
2.5 Accessories.....	9
2.6 Hardware Description.....	10
2.7 Example of a ServSwitch CWDM Mux System	10
2.8 Compatibility.....	11
3. Installation.....	12
3.1 Interconnection Cable Requirements	12
3.2 System Setup	12
3.3 Diagnostics.....	12
4. Troubleshooting.....	13
4.1 Problem/Solutions	13
4.2 Contacting Black Box.....	13
4.3 Shipping and Packaging	13
Appendix A: Rackmount Options.....	14
Appendix B: Glossary.....	15

Quick Setup Guide

This section briefly describes how to install your ServSwitch CWDM Mux system. Unless you are an experienced user, we recommend that you follow the full procedures described in the rest of this manual.

Install system

1. Install the ServSwitch CWDM Mux transceivers in the local and remote units. Each wavelength must not appear more than once in the system. Device pairs must carry transceivers with the same wavelength.
2. Connect interconnection cables from remote/local unit to the ServSwitch CWDM Mux—make sure you connect the transceivers to the matching port of the ServSwitch CWDM Mux. Be sure to use single-mode fiber cable between the local and remote units via the common link.
3. Power on the system.



1. Specifications

Connectors: LC duplex fiber

Maximum Length of Interconnection Cable (Fiber–LC Connectors): Single-mode 9 μm : 40,000 m (approx. 25 miles)

Temperature Tolerance: Operating: 41 to 113° F (5 to 45° C);
Storage: -13 to +140° F (-25 to +60° C)

Relative Humidity: Up to 80%, noncondensing

Power: No power supply required

Size: ServSwitch™ CWDM Mux units: 8"H x 5.6"W x 1.7"D (20.6 x 14.3 x 4.2 cm)

Product Weight: Local/Remote Unit: 2.2 lb. (1 kg)

Shipping Box Size: 18.1"H x 9.8"W x 4.7"D (46 x 25 x 12 cm)

Shipping Weight: 3.5 lb. (1.6 kg)

2. Overview

2.1 Introduction

The ServSwitch CWDM Mux breaks away from the traditional model of using fiber interconnection cables. With the ServSwitch CWDM Mux, you can send up to four bidirectional data streams simultaneously over a single pair of fiber cables. Wherever you run low on installed fibers or when you want to avoid installing new fibers, you can use the ServSwitch CWDM Mux. It's suitable for all kinds of single-mode fiber cables. It works with matching CWDM transceiver modules with wavelengths of 1530, 1550, 1570, or 1590 nm.

A ServSwitch CWDM Mux reduces the number of required fibers for a number of independent data links. The ServSwitch CWDM Mux mixes the signals in different wavelengths onto a single fiber and splits it again into the original signals at the end of a link. A basic ServSwitch CWDM Mux system consists of a local KVM extender unit and a remote KVM extender unit.

2.2 Features

The ServSwitch CWDM Mux offers the following features:

- Support for up to four data streams.
- Support for 9- μ single-mode fibers.
- No power supply unit is required.
- Small footprint chassis.
- Rackmountable.

2.3 What's Included

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

- (2) ServSwitch CWDM Muxes (ACXCWDM4): (1) local unit + (1) remote unit (local and remote units are identical)
- CD-ROM containing this user's manual (includes quick setup instructions)

2.4 You Will Also Need

- ServSwitch single-mode transmitters and receivers (ACS4001A-R2-SM)

2.5 Accessories

- ServSwitch CWDM Mux Transceiver 1530 nm (LFP254) for the ACS4001A-R2-SM transmitter and receiver
- ServSwitch CWDM Mux Transceiver 1550 nm (LFB255) for the ACS4001A-R2-SM transmitter and receiver
- ServSwitch CWDM Mux Transceiver 1570 nm (LFP256) for the ACS4001A-R2-SM transmitter and receiver
- ServSwitch CWDM Mux Transceiver 1590 nm (LFB257) for the ACS4001A-R2-SM transmitter and receiver
- 19" rackmount kit to mount up to 2 WDM mux/demux devices (ACS2209A-RMK)

2.6 Hardware Description

Figure 2-1 shows the front panel of the ServSwitch CWDM Mux. Table 2-1 describes its components.

NOTE: The back panel of the unit is just a blank panel.

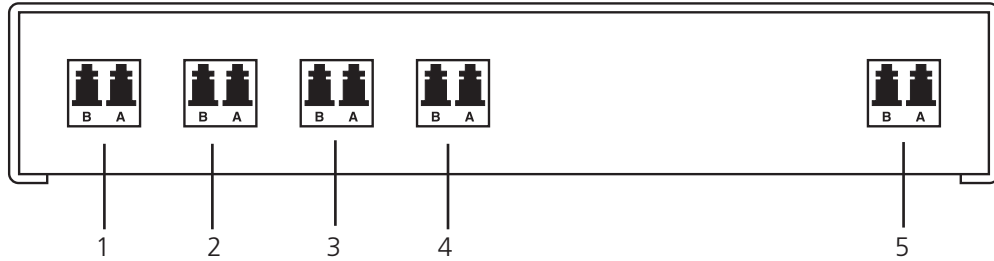


Figure 2-1. Front panel.

Table 2-1. Front-panel components.

Number	Component	Description
1	Duplex LC connector	1530 port
2	Duplex LC connector	1550 port
3	Duplex LC connector	1570 port
4	Duplex LC connector	1590 port
5	Duplex LC connector	Interconnect port

2.7 Example of a ServSwitch CWDM Mux System

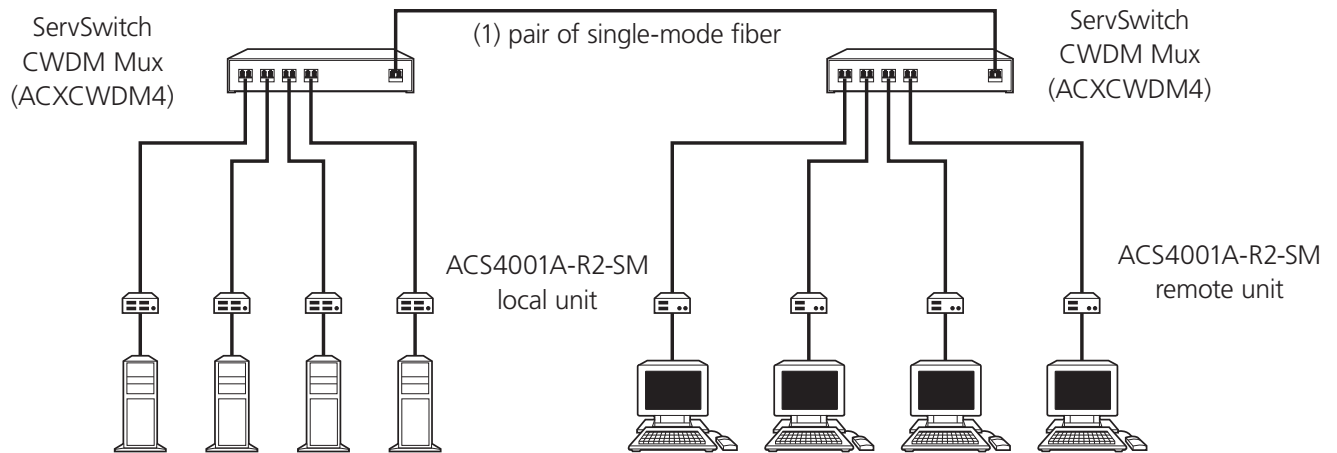


Figure 2-2. Typical ServSwitch CWDM Mux application.

2.8 Compatibility

Interface compatibility: Single-mode fiber data: Incoming optical light signals are multiplexed onto the single-mode fiber and de-multiplexed at the remote end.

3. Installation

For first-time users, we recommend that you carry out a test placement, confined to a single room, before commencing full installation. This will help you to identify and solve any cabling problems, and experiment with the KVM extender system more easily.

3.1 Interconnection Cable Requirements

To connect the local and remote ACS4001A-R2-SM units to the ServSwitch CWDM Mux box and to interconnect the ServSwitch CWDM Mux boxes, you'll need:

- Fiber cable: Two strands of fiber are required for connecting the local and remote ACS4001A-R2-SM units to the ServSwitch CWDM Mux box and to interconnect both Mux/Demux boxes.
- Recommended cables: Single-mode type 9/125 μ .
- Maximum cable length: Approximately 25 miles (40 km).

3.2 System Setup

To install your ServSwitch CWDM Mux system:

1. Switch off all devices.
2. Install the ServSwitch CWDM Mux Transceivers in the local and remote CWDM Mux units. Each wavelength must not appear more than once in the system. Device pairs must carry transceivers with the same wavelength.

NOTES: Each wavelength (1530, 1550, 1570, 1590 nm) must not be used more than once at each side! For four links, use four different wavelengths; for three links, use three different wavelengths; and for two links, use two different wavelengths.

Each transceiver will work only at the appropriate port.

The data will always flow between devices with the same wavelengths.

3. Connect interconnection cables from the remote/local ACS4001A-R2-SM unit to ServSwitch CWDM Mux—make sure that you connect the transceivers to the matching port at the ServSwitch CWDM Mux.
4. Connect local and remote ServSwitch CWDM Mux units with matching interconnection cable (single-mode fiber).
5. Power on the system.

3.3 Diagnostics

There are no diagnostics on the ServSwitch CWDM Mux. Please use the capabilities of the attached units.

4. Troubleshooting

4.1 Problem/Solutions

Problem: There isn't a data link.

Possible Causes/Solutions:

1. Check the attached devices by directly connecting the local unit to the remote unit using a short fiber cable.
2. Check that each wavelength does not occur more than once at the local side and at the remote side.
3. Check that the transceivers are routed to the correct ports on the ServSwitch CWDM Mux.

4.2 Contacting Black Box

If you determine that your unit is malfunctioning, do not attempt to alter or repair it. It contains no user-serviceable parts. Contact Black Box Technical Support at 724-746-5500 or info@blackbox.com. Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- The nature and duration of the problem.
- When the problem occurs.
- The components involved in the problem—that is, what type of computers, what type of keyboard, brand of mouse, make and model of monitor, type and make of cable, etc.
- Any particular application that, when used, appears to create the problem or make it worse.
- The results of any testing you've already done.

4.3 Shipping and Packaging

If you need to transport or ship your unit:

- Package it carefully. We recommend that you use the original container.
- If you are shipping it for repair, please include the ServSwitch CWDM Mux's external power supplies. If you are returning it, please include everything you received with it. Before you ship the unit back to your Black Box for repair or return, contact us to get a Return Authorization (RA) number.

Appendix A. Rackmount Options

ServSwitch CWDM Mux units can be mounted in a 19" rack using the mounting kit.

Use the rackmount kit (ACS2209A-RMK) to mount up to four devices of the dual-head devices' size 4.1"H x 5.6"W x 16.5"D (10.3 x 14.3 x 4.2 cm) into a 19" server rack. The rackmount kit requires 1U of rack space. Use blank plates to cover unused device positions.

The Rackmount Kit (ACS2209A-RMK) contains the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

- (1) base plate
- (7) M2, 5x2 spacers
- (3) blank plates
- (8) M2, 5x5 Phillips countersunk screws

You can mount up to two ServSwitch CWDM Muxes into a 1U rack space.

Follow these steps to rackmount the units:

1. Align the holes on the base plate with the empty screw holes on the base of the device.
2. Fasten the base of the unit to the plate of the mounting kit.
3. Only use the supplied short screws to prevent damages to the printed circuit boards.
4. Close the remaining gaps with blank plates.

Using the rackmount kit, you can mount one to four devices. In the leftmost position, you can install a rackmountable power supply unit to power up to three devices.

Appendix B. Glossary

The following terms are used in this manual:

Fiber: single-mode or multimode fiber cable.

Single-mode: 9- μ single-mode fiber cable.

Multimode: 62.5- μ or 50- μ multimode fiber cable.

KVM: Keyboard, video, and mouse.

Console: Keyboard, mouse, and monitor.

Dual Access: A system allowing connection of local and remote user consoles.

Single-Head: An extender system that supports one monitor + keyboard/mouse.

Dual-Head: An extender system that supports two monitors + keyboard/mouse.

DVI: Digital video standard, installed by Digital Display Working Group (www.ddwg.org). R, G, B, CLOCK in a data stream with up to 3x 1.6 Gbps signals are TMDS Level.

PSU: The desktop power supply unit connected to the local/remote unit.

HID: Human Interface Devices are units that are used for human access to the CPU. HID is a USB-device class of its own. Typically, they are generic devices (for example, some memory devices, etc.). Generic keyboard and mouse, generic touch screen, generic light pen, generic fingerprint sensor, generic graphic tablets, etc. are examples of HID devices.

CWDM: Coarse Wavelength Division Multiplexing is a technology that multiplexes multiple optical carrier signals on a single optical fiber by using different wavelengths (colors) of laser light to carry different signals.

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